



MADRID

MADRID

FROM A SMART AND SUSTAINABLE CITY...

Capital
Digital



oficina
digital
MADRID



...Towards a human adaptive city

Madrid Digital Capital

Because digital is capital



MADRID



Capital
Digital

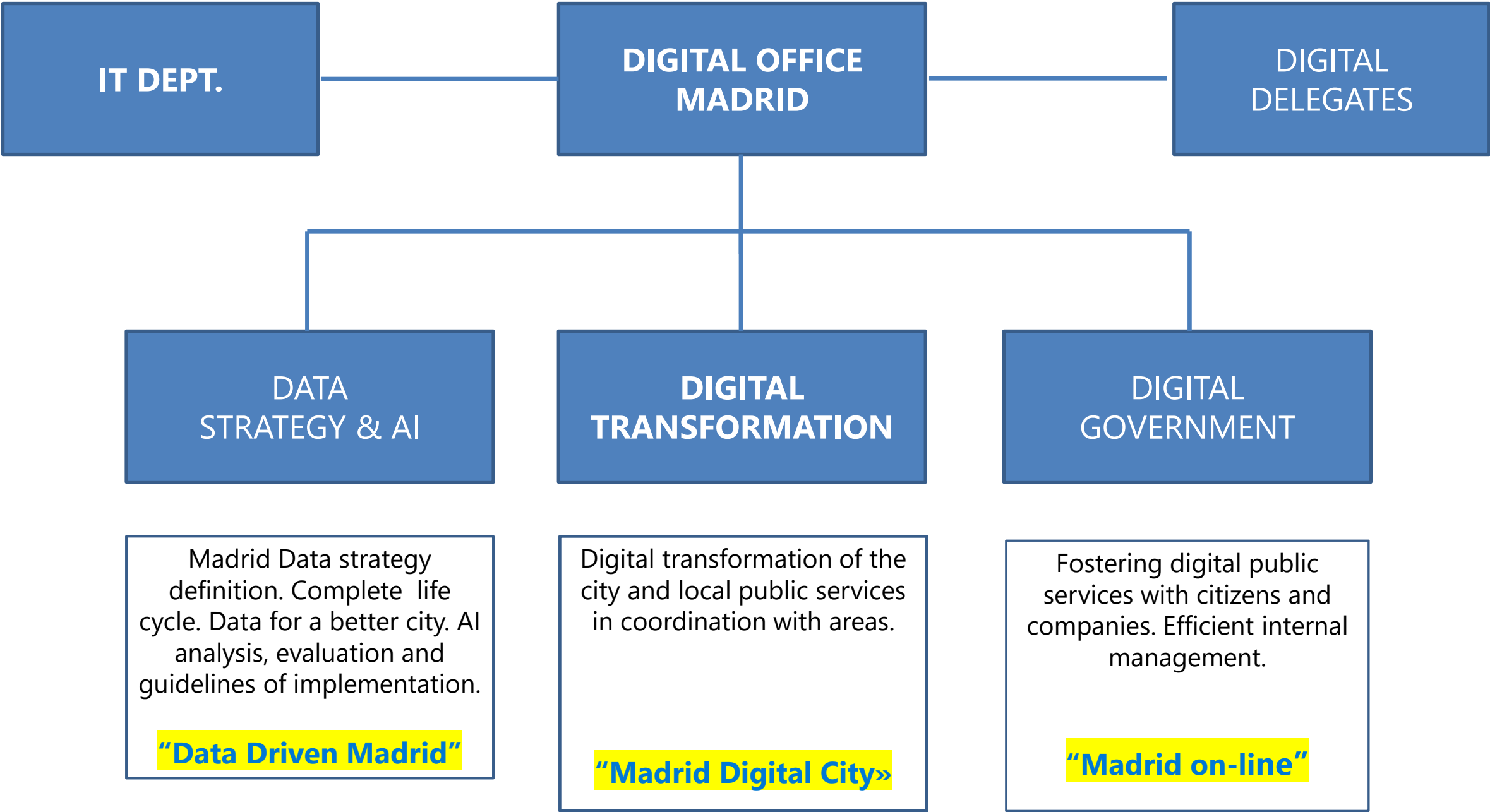
Bloomberg
Philanthropies





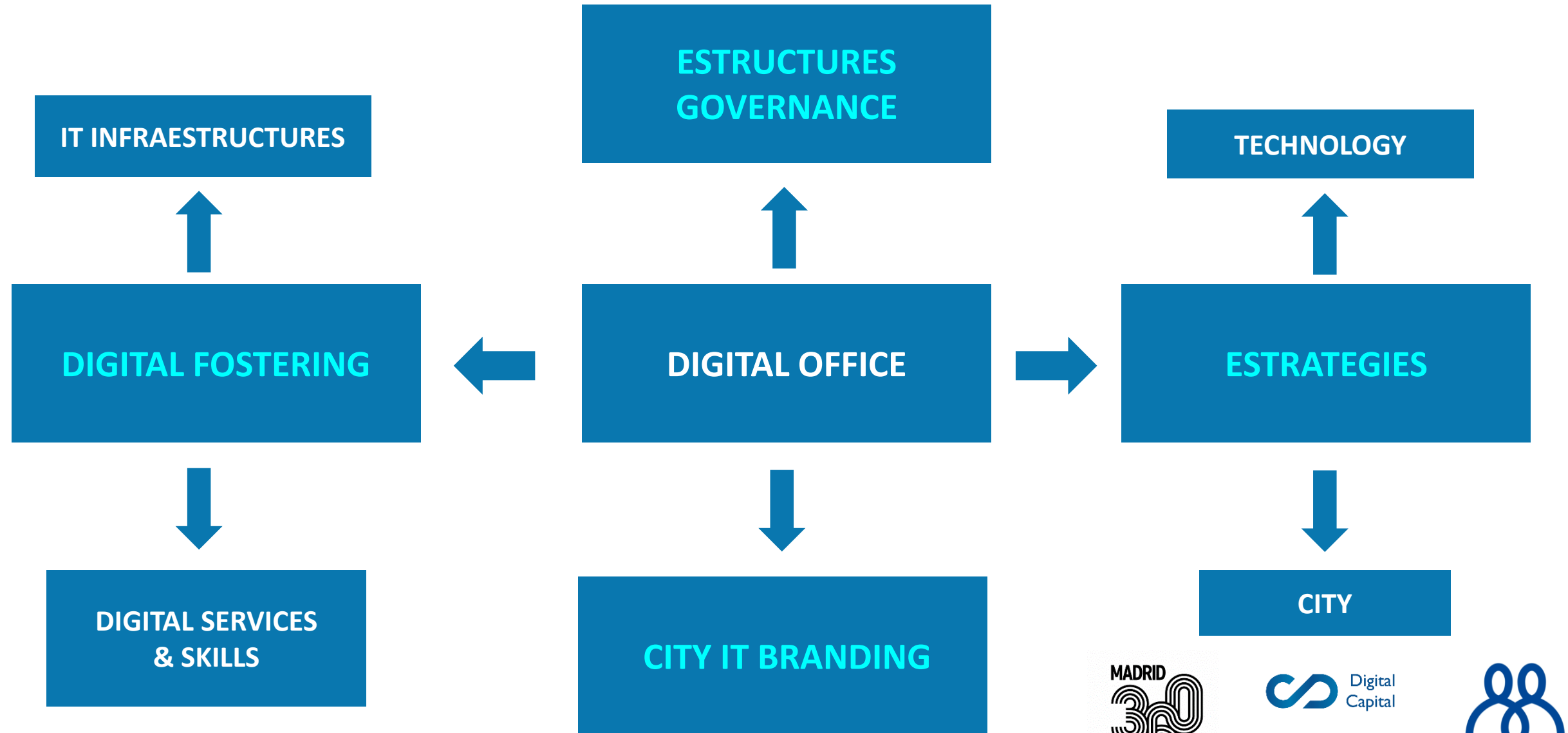
WHO WE ARE: MADRID DIGITAL OFFICE

DIGITAL OFFICE ORGANIZATION (2020)



DIGITAL OFFICE - MADRID

PRIORITIES – MAIN LINES OF WORK





OUR VISION

From the Smartcity to a 5.0 City

OPEN, NEUTRAL AND INTEROPERABLE City



HUMAN ADAPTIVE CITY



A user Centricities Vision

- Madrid usercetricity:
- INTELLIGENT PROCESS MANAGEMENT
- New generation of Smart & Sustainable Cities
- Urban Intelligent spaces: People first
- Hyperconnectivity
 - Interoperability
 - 5G / 6G
 - IoT
- Hyperautomation
 - Dataspaces
 - AI
 - Digital Twin
 - City Brain
- Dynamic & Flexible manage of services
- Intensity of use – Flexible taxes
- Replicability & Scalability

MORE HUMAN, GREENER, DIGITAL AND SUSTAINABLE



CONTEXT

CONTEXT

MADRID- SPAIN- EUROPE



Brújula Digital 2030 de la UE
Digital Compass 2030 of the EU



Plan de Recuperación
Transformación y Resiliencia
*Recovery, Transformation and
Resilience Plan.*



Declaración Europea sobre los
Derechos y Principios Digitales
para la Década Digital
*European Statement about the
Digital Rights and Principles for the
Digital Decade*



España Digital 2026
y planes
*Digital Spain 2026
and plans*



EUROPEAN STRATEGY POST-COVID: GREEN-DIGITAL TWIN TRANSITION FOR EVERYONE

Madrid in Europe, Europe in Madrid

A strategy that is coherent with the European, national and local context, and which is aligned with the city plans of the different municipal areas.



EU Digital Compass 2030



Recovery, Transformation and Resilience Plan.



Strategic Plan for the City of Madrid



Recovery, Transformation and Resilience Plan for the city of Madrid



European Declaration on Digital Rights and Principles for a Digital Decade



Digital Spain 2026 and plans



Village Agreements



Government Area Strategies and Plans



Madrid's Digital Transformation Strategy 2023-2027



DIGITAL TRANSFORMATION STRATEGY

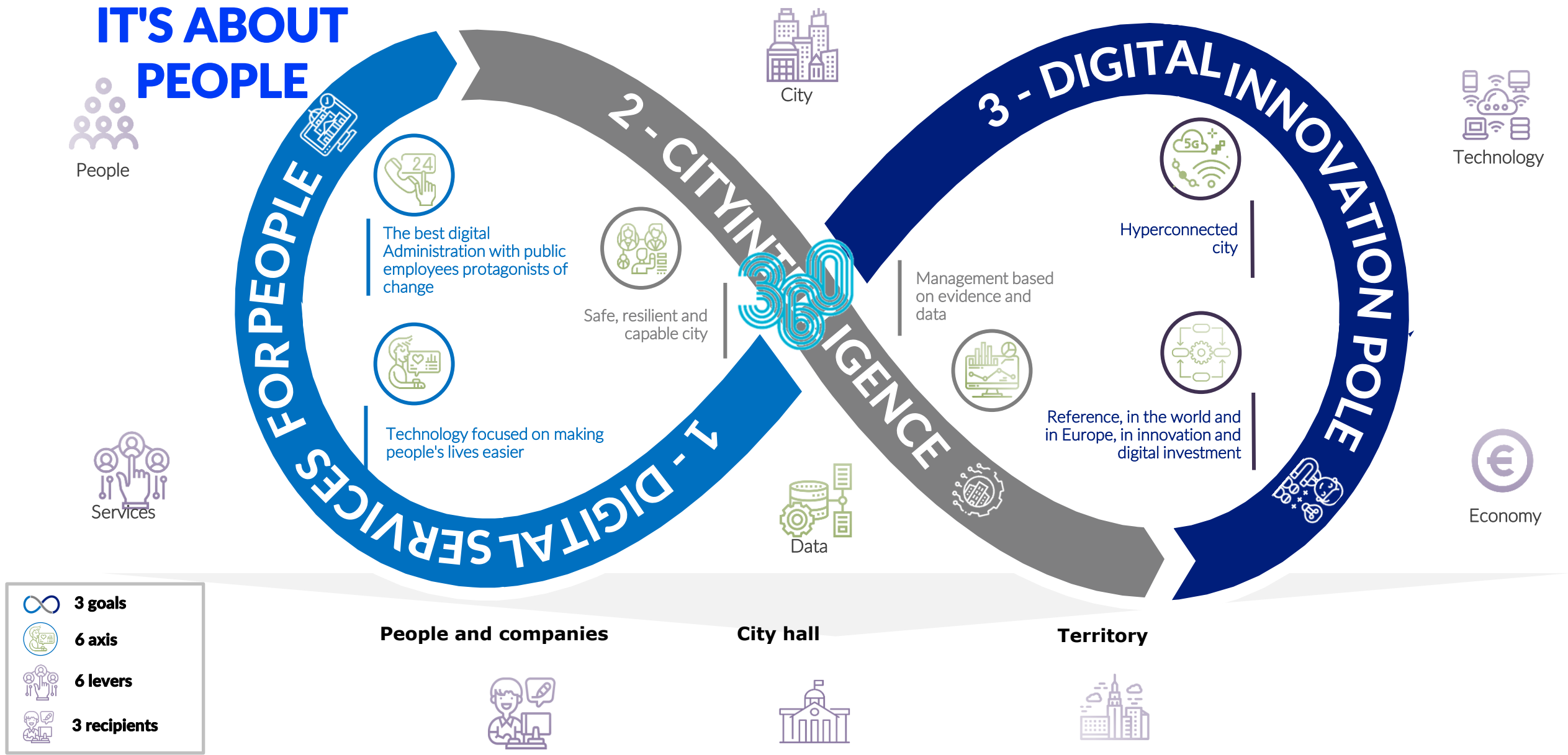
2023-2027

DIGITAL TRANSFORMATION STRATEGY

Two **strategic axes** are configured around each of the strategic objectives, which are outlined as a tool for **defining the scope and sphere of action** of the objective.

IT'S NOT JUST ABOUT TECHNOLOGY

IT'S ABOUT PEOPLE

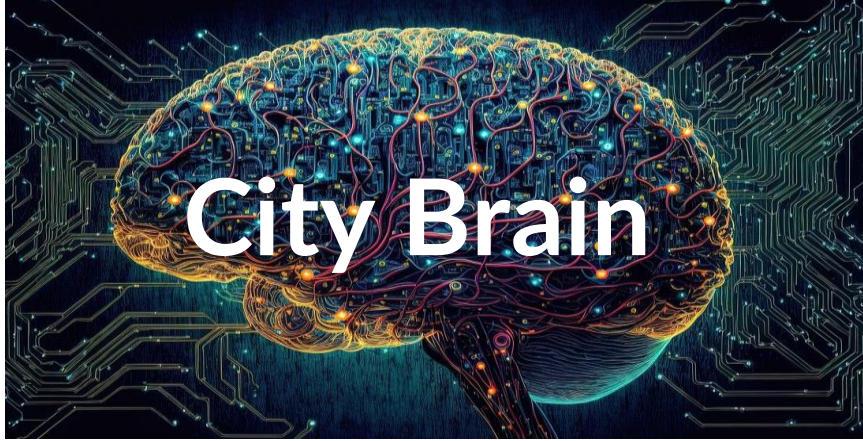






Digital Twin

A night cityscape with a digital grid overlay and two silhouetted figures in the foreground.



City Brain

A stylized brain composed of circuitry and glowing nodes, set against a dark background.



5G_IoT
Hyperconnected City

A cityscape at night with a network of glowing lines and nodes connecting various points.



City Intelligence
Madrid Smart
City

A hand holding a tablet displaying a city map with various data points and icons.



Inclusive, Close
and
Capable City

Silhouettes of people of different ages and ethnicities in front of a city skyline.



Digital
Skills
for ALL

A group of people sitting at a table, working on laptops in a collaborative environment.



5.0
City Council
Smart Process
Platform

A person's hands typing on a laptop keyboard with a cityscape in the background.



AI &
Automatisation

A cityscape at night with a road and a car in the foreground.



Integrated
Citizen Service
Platform

A person's hand pointing at a laptop screen displaying a website.

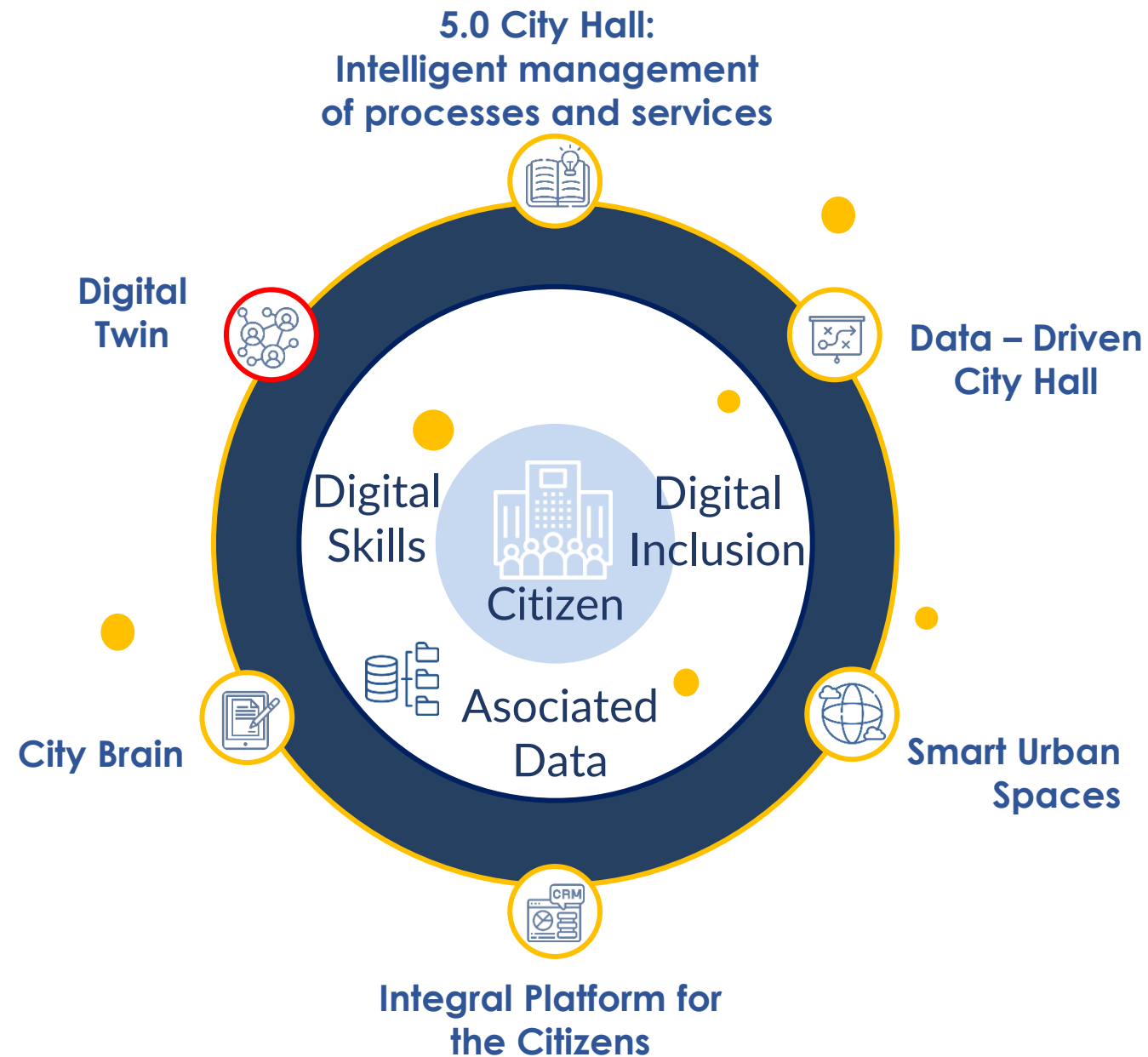


DATA, DATA & MORE DATA

Use of Data in City Council



We identified a set of **transversal and transformative projects** for Madrid City Council related to the Digital Twin project, associated with a revolution in the **use of data** associated with the citizen in order to offer more **personalized, adapted and higher quality services**.



Data Strategy

OBJECTIVES

Data Driven Organization

Monitoring the Data Strategy for Europe

Alignment with the City's Strategy and Objectives

Moving towards a Data Culture

Enhancing the value of data and the knowledge linked to it

Ensuring data security and protection and ethical use

Drive internal and external data reuse

Increase efficiency in the management and provision of services

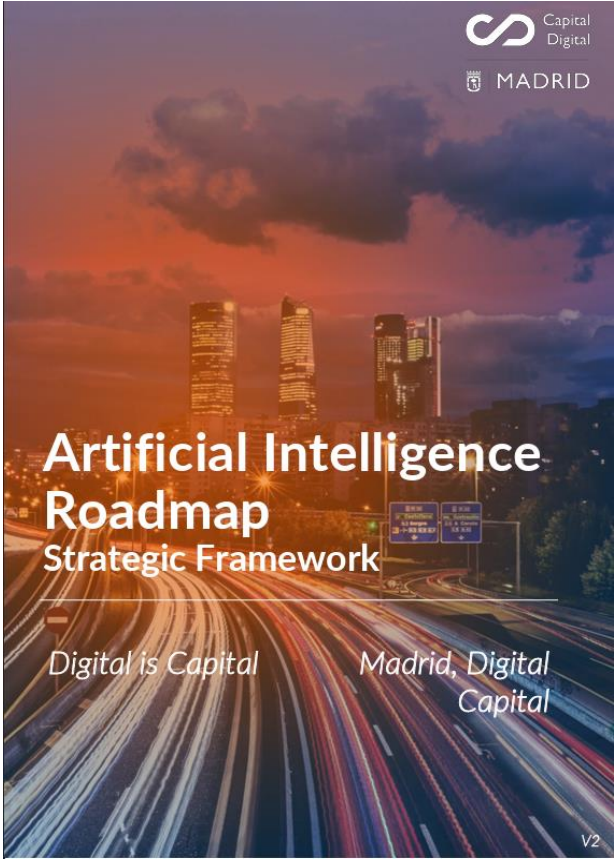
STRATEGY



LINES OF ACTION



AI Roadmap



LEGITIMACY

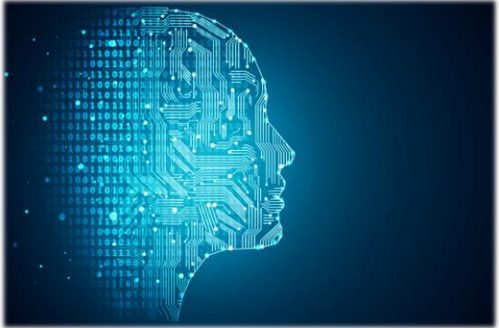
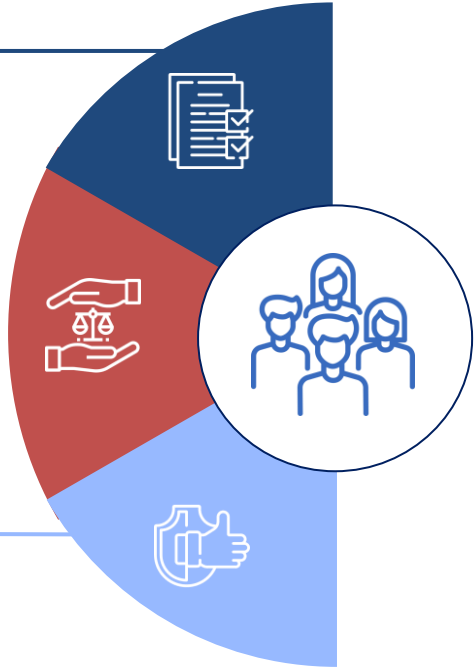
Ensuring compliance with all applicable laws and regulations.

ETHICS

Respecting and ensuring adherence to ethical principles and values.

ROBUSTED

Both technically and socially, as AI systems, even if well-intentioned, can cause accidental damage.



REAL
IMPACT

TRANSPARENCY



ETHICS

ENFORCEABILITY



CAPACITY
BUILDING

COORDINATION



UNIÓN EUROPEA

EL PARLAMENTO EUROPEO EL CONSEJO

Bruselas, 14 de mayo de 2024
(OR. en)

2021/0106(COD) PE-CONS 24/24

TELECOM 54
JAI 238
COPEN 69
CYBER 37
DATAPROTECT 76
EJUSTICE 11
COSI 16
IXIM 49
ENFOPOL 63
RELEX 180
MI 151
COMPET 154
CODEC 412

ACTOS LEGISLATIVOS Y OTROS INSTRUMENTOS

Asunto: REGLAMENTO DEL PARLAMENTO EUROPEO Y DEL CONSEJO por el que se establecen normas armonizadas en materia de inteligencia artificial y por el que se modifican los Reglamentos (CE) n.º 300/2008, (UE) n.º 167/2013, (UE) n.º 168/2013, (UE) 2018/858, (UE) 2018/1139 y (UE) 2019/2144 y las Directivas 2014/90/UE, (UE) 2016/797 y (UE) 2020/1828 (Reglamento de Inteligencia Artificial)

EU Artificial Intelligence Act

MAIA - AI Strategy in the city of Madrid

INNOVATION AND
ENTREPRENEURSHIP

- Relations with companies.
- Establishment of funding mechanisms
- Management of aid to companies.

DIGITAL OFFICE

- Leadership and Strategy
- Alignment with Digital Transformation strategy
- Data ethics and accountability

IAM

- Technology Centre: Platform + Technology Framework
- Project implementation and coordination

Responsible

External Community



Principles



Platform



Internal Community

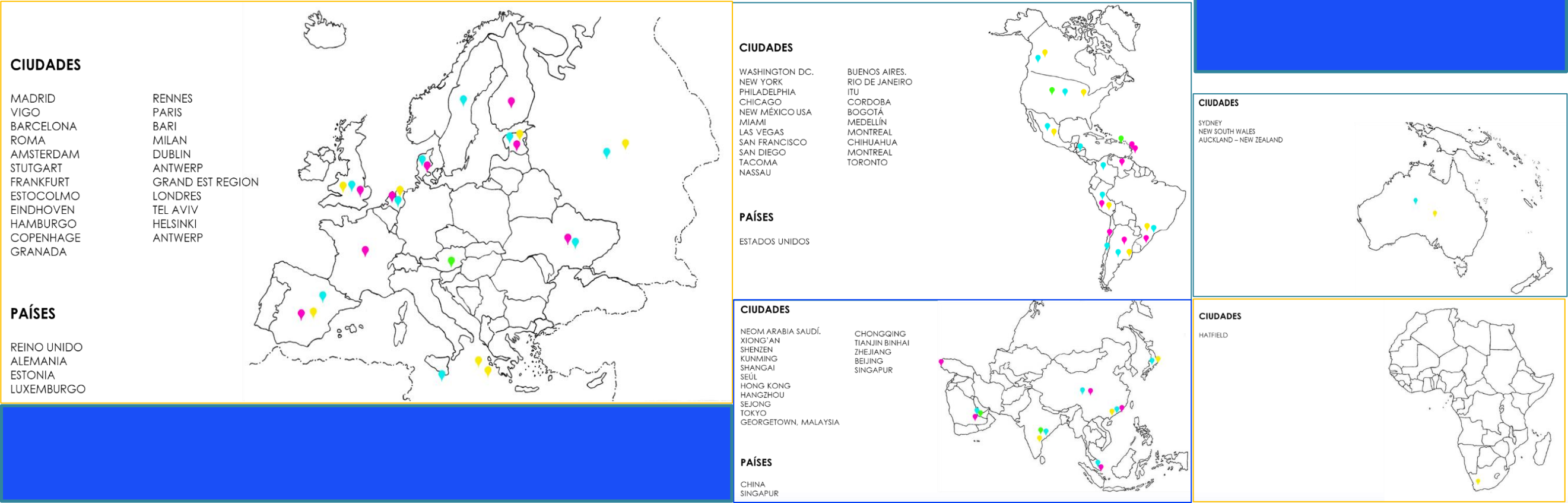




DIGITAL TWIN: OUR VISION

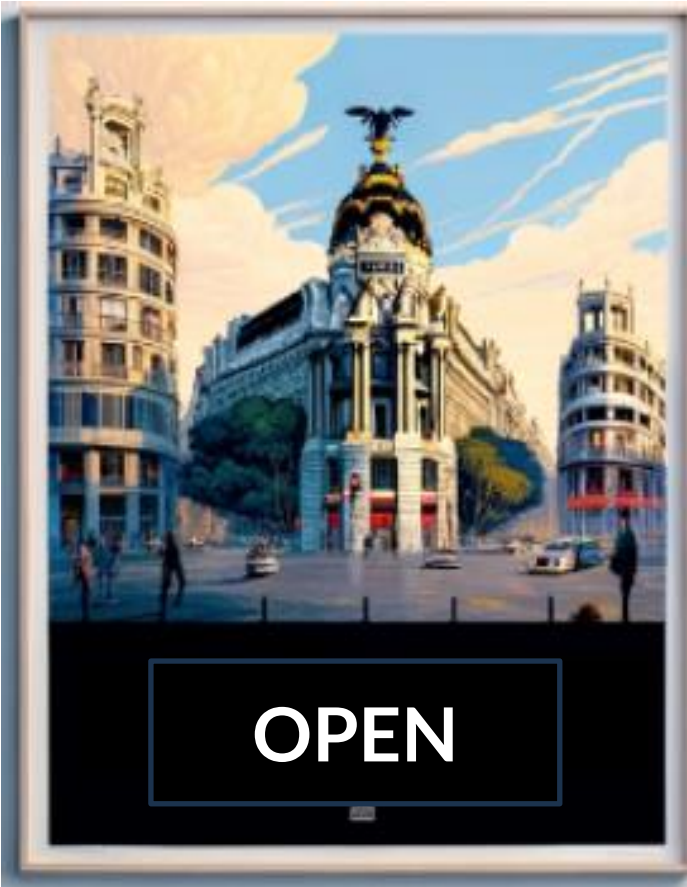
Where we *START FROM*?

International context and benchmark: MORE THAN 50 CITIES STUDIED



Colaboration is the KEY

Madrid Digital Twin PILARS



S
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E

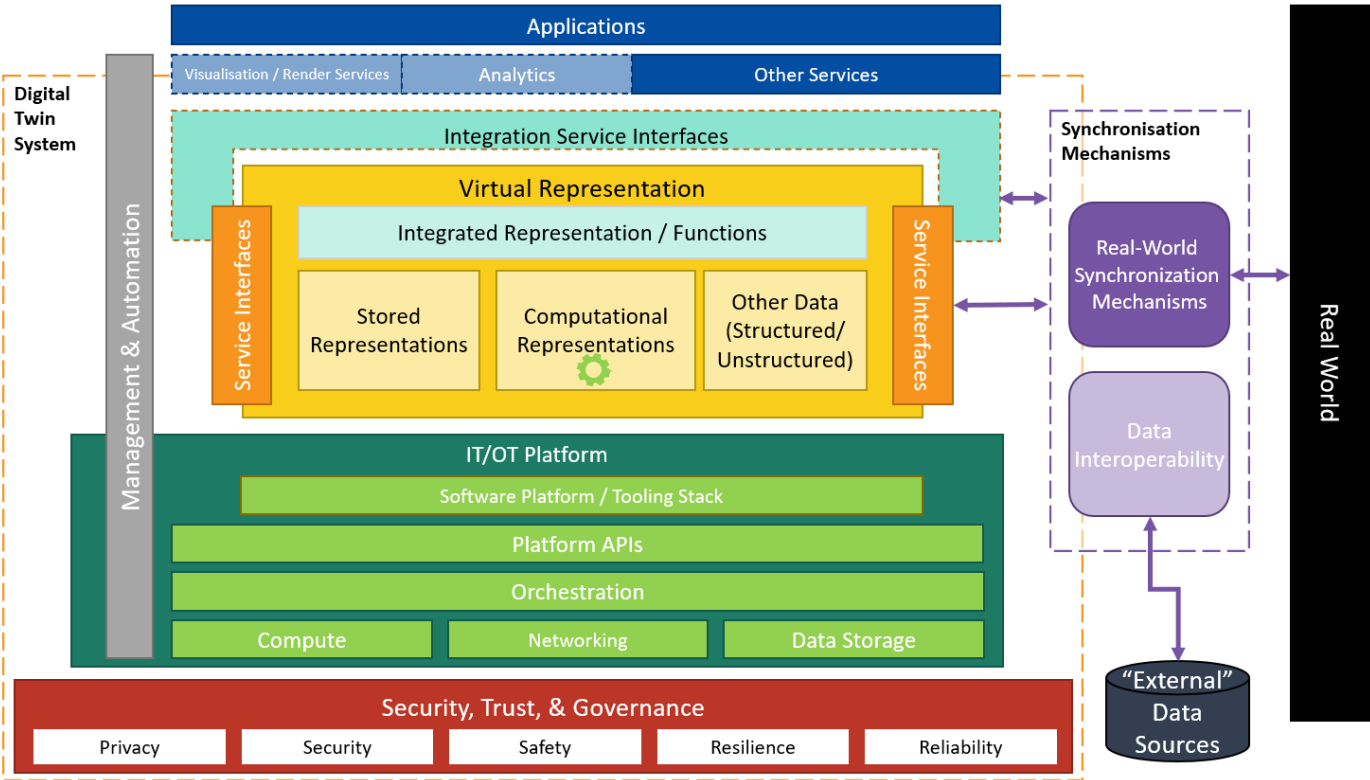
INTEROPERABLE

Open & Modular ARCHITECTURE

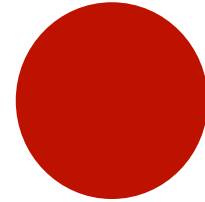
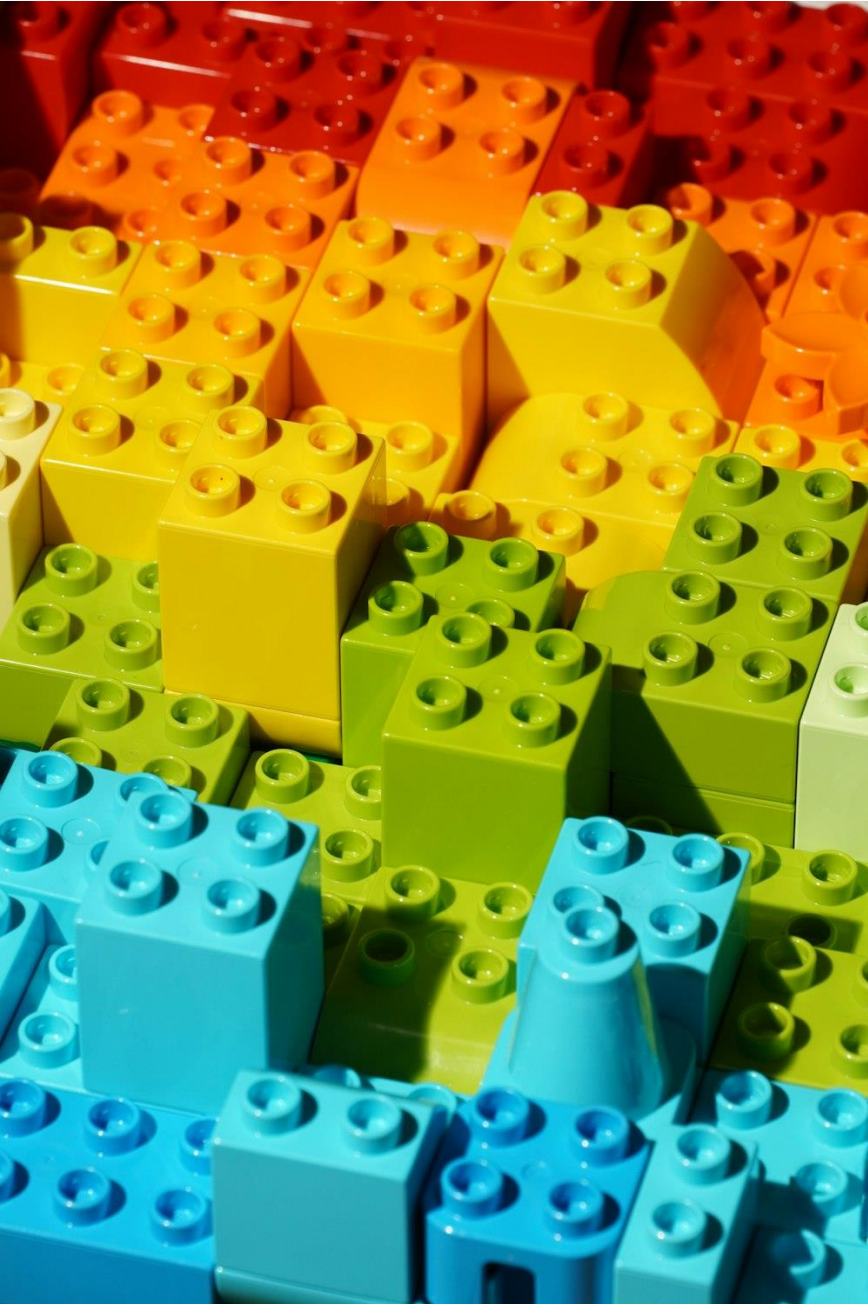
The implementation of a Digital Twin as a Service architecture involves taking into account the following **three elements or technical-functional groupings**, which must be brought together in an integrated system:



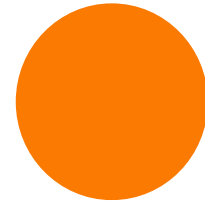
REFERENCE ARCHITECTURE



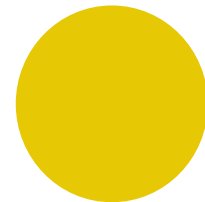
*Other important **PIECES***



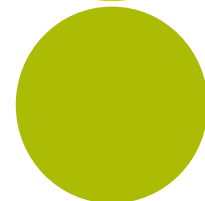
Governance and Collaboration



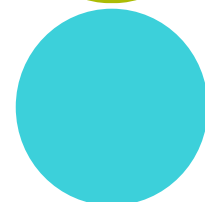
Innovation and involvement of the Govtech ecosystem



Promotion of digital skills, support and change management



Co-design and co-creation with citizens and companies



Education



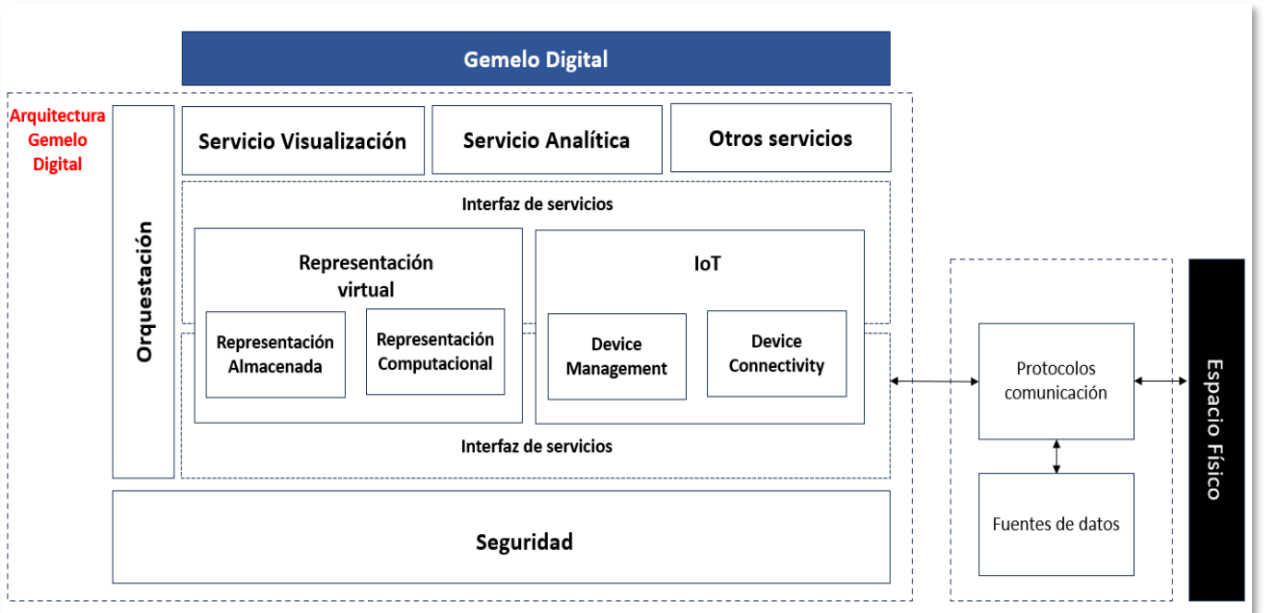
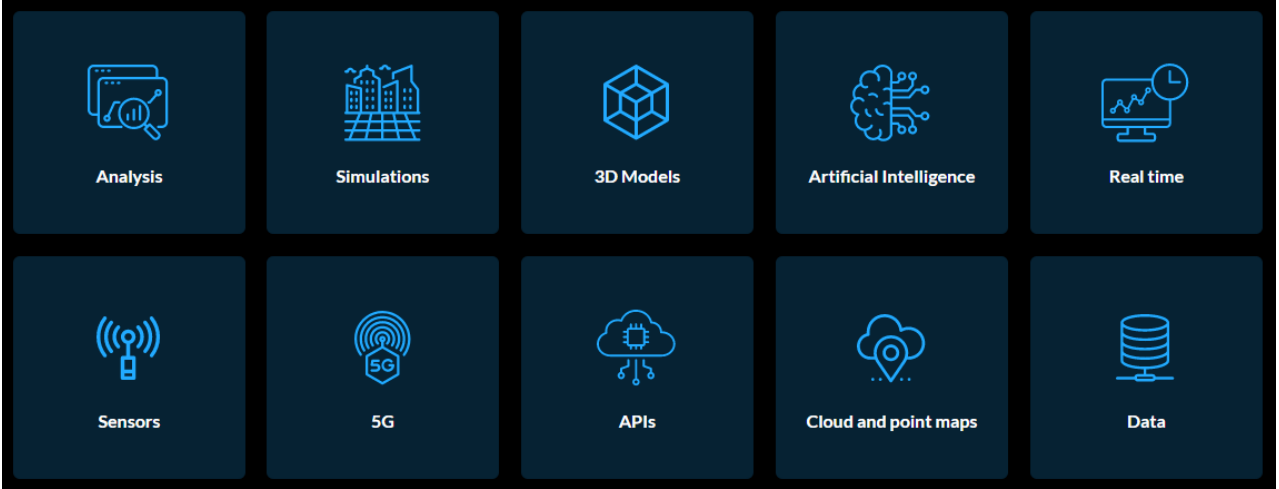
DIGITAL TWIN OF DIGITAL TWINS

MADRID
OPEN & INTEROPERABLE CITY

Modularity and reusability

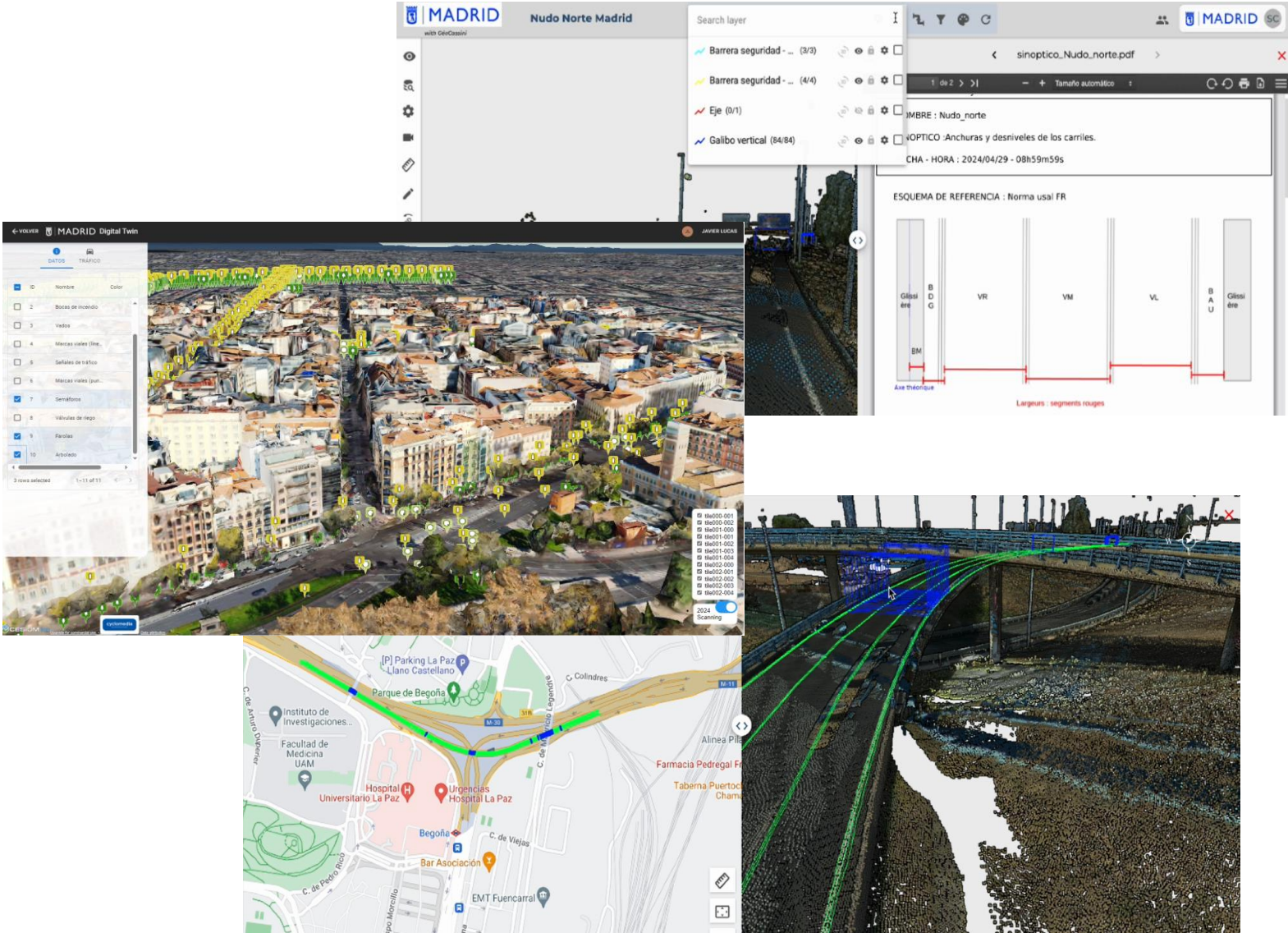


COMMON COMPONENTS CATALOG



Data and AI Model Marketplace

<https://gemelo.madrid.es/en>
<https://gemelo.madrid.es/en>



DIGITAL TWIN of DIGITAL TWINS



Analysis

Simulations

3D Models

Artificial Intelligence

Real time

Sensors

5G

APIs

Cloud and point maps

Data



DIGITAL-TWIN: USES CASES

- The aim is to design a digital twin platform that provides a flexible, scalable and interoperable solution for various technologies, industries and use cases.
- The platform will be designed to be deployable across multiple cloud providers making it adaptive (**agnostic and cloud-ready**).
- It will use geo-featured data from municipal services that make up a GeoDataLake that will enable advanced analytics with geospatial capabilities (**data is king**).
- The capabilities of the Digital Twin Platform will be integrated and offered as a service that can be consumed by users and other systems through APIs (**as a service**).



<https://gemelo.madrid.es/en>



VSD Madrid New North

[Learn more](#) →



VSD Bailén Bridge

[Learn more](#) →



VSD Madrid Half Marathon

[Learn more](#) →



VSD City Inventory

[Learn more](#) →



VSD Mercamadrid

[Learn more](#) →



VSD Parade of Kings

[Learn more](#) →



EUI Smart Urban Space

[Learn more](#) →



VSD Landscape of Light

[Learn more](#) →



VSD Santiago Bernabeu

[Learn more](#) →



VSD Citizen Sentiment

[Learn more](#) →



VSD M30 "Madrid Nudo Norte"

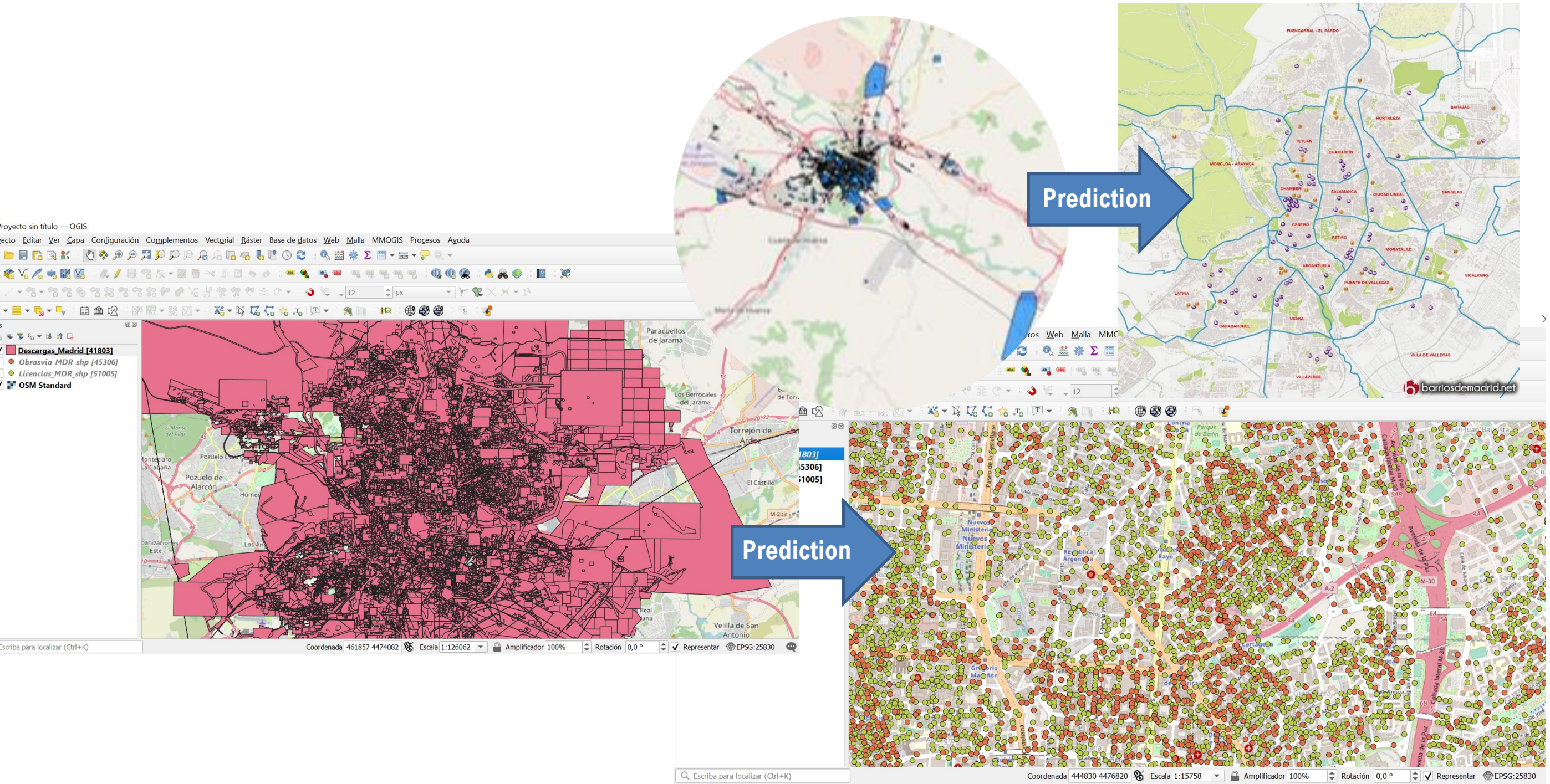
[Learn more](#) →



VSD Urban Planning

[Learn more](#) →

Underground Infrastructure... too



Digital Twin in Madrid City - NOW

Project Scope

- 1 Research and analysis
- 2 Design
- 3 Governance and management
- 4 Scalability & Implementation
- 5 Training and Education
- 6 Maintenance and upgrades
- 7 Evaluation and Updating

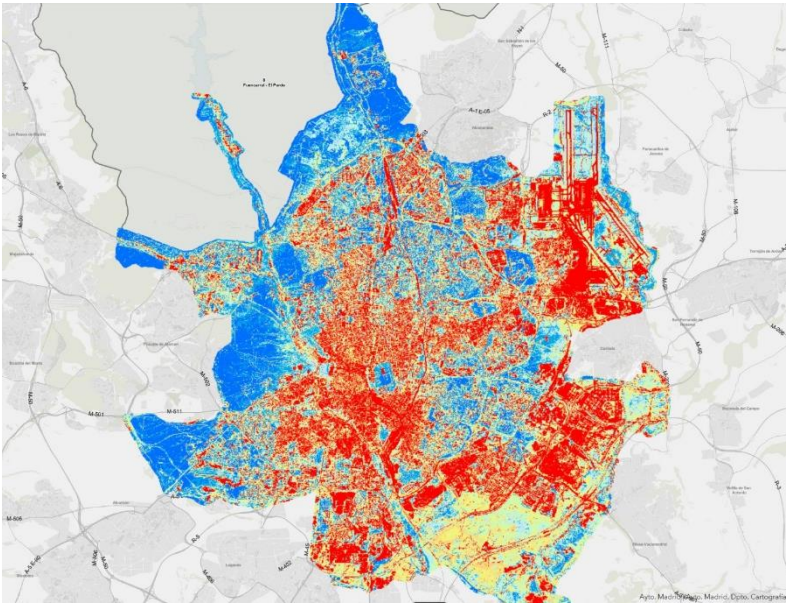
Functional Domains

- 
1. SECURITY
 2. UTILITY
 3. MOBILITY
 4. URBAN INFRASTRUCTURE
 5. HEALTH
 6. ENVIRONMENT
 7. SPORTS AND CULTURE
 8. TOURISM
 9. EDUCATION
 10. EMPLOYMENT
 11. ECONOMY
 12. URBAN PLANNING
 13. SOCIAL

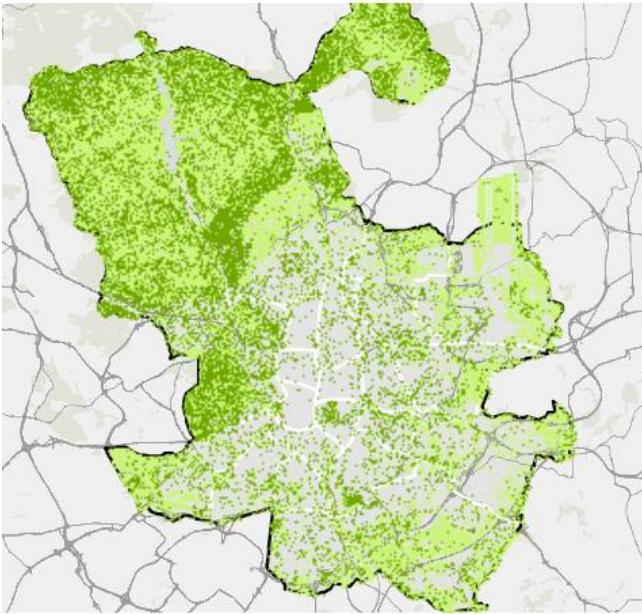
Madrid City Council 'GeoPortal'



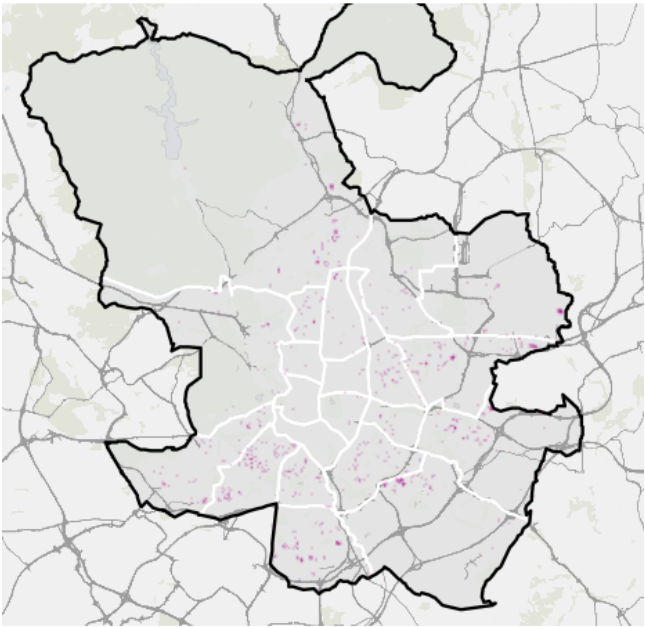
Heat Island Map



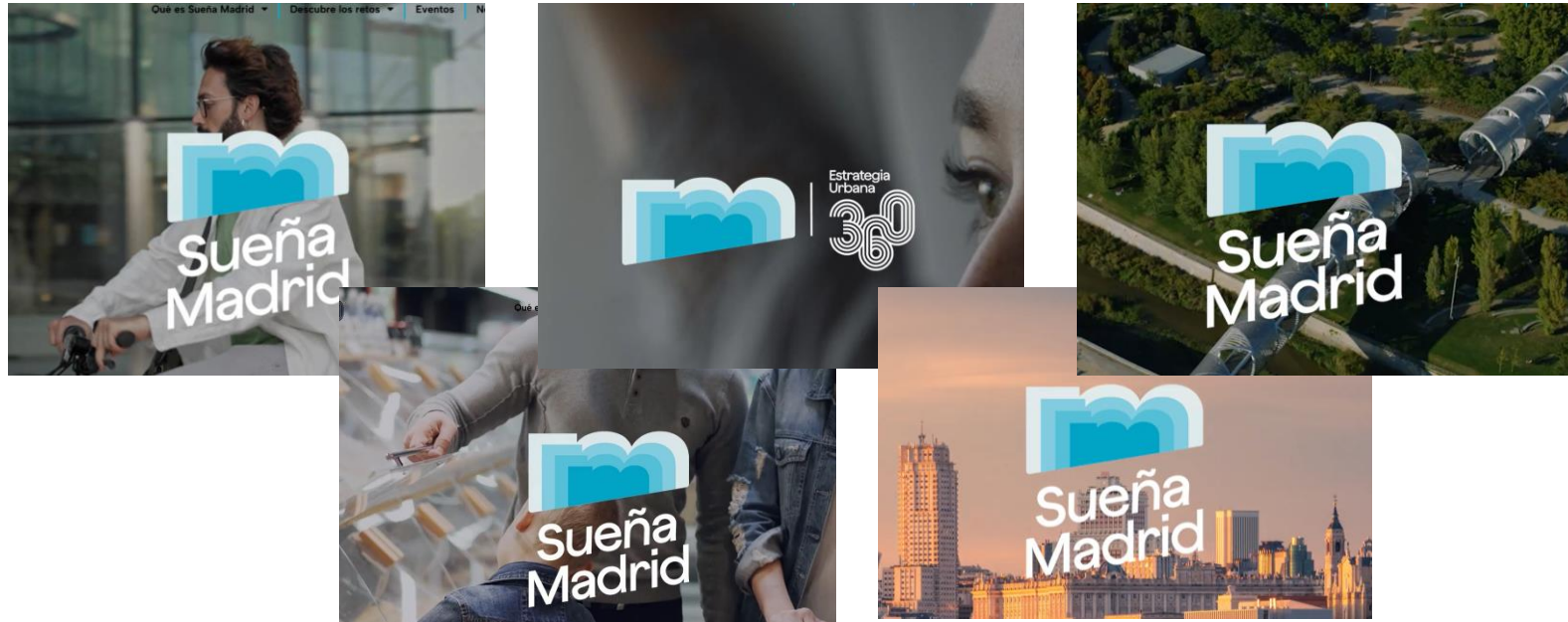
Green Areas Map



Abestos Map



New Strategic Masterplan 'DREAM MADRID'



new instrument that defines the new model of the city for the coming years.

new Paradigm in City Design

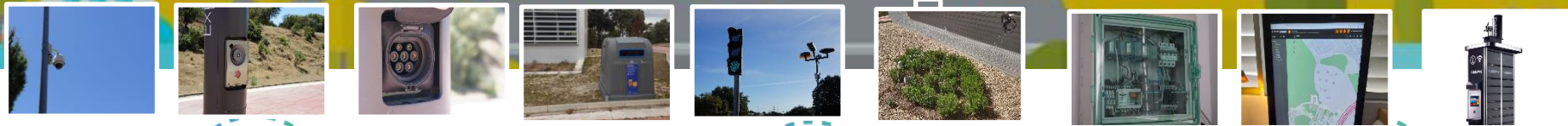
challenges





SMART URBAN SPACES

MADRID REALTIME CITY



OPEN CENTRE

To reduce possible economic barriers for companies

INTEROPERABLE

To facilitate the connection between different devices and sensors, so th

NEUTRAL

To ensure access to libraries, information and knowledge.



<https://youtu.be/P8CCxmrZNRQ?feature=shared&list=PLaxP1gUf9OHFZW8Q4SGWQV83Z6v-Gwnl2>

5G Corridors

Smart Urban Spaces with 5G connectivity to develop **interoperable** use cases in **real-world** demonstrator environments.



MONCLOA - ARAVACA

ETSIT

Investigación en bandas milimétricas
En licitación

Casa de Campo

Drones, Videojuegos, SAMUR 5G
En licitación

EMERGENCIAS

Network Slices para emergencias
En licitación

Ciudad Universitaria

5G para otras especialidades
Diseñado, pendiente de financiación
(UNICO 5G)

ARGANZUELA

Matadero

Mayores, Medialab y videoarte
Diseñado, pendiente de financiación
(UNICO 5G)

Centros de Innovación

SAN BLAS
MORATALAZ
VICÁLVARO
PUENTE DE VALLECAS
CARABANCHEL
VILLAVERDE

CENTRO

Oficina de Turismo
Realidad eXtendida
Diseñado, pendiente de financiación (UNICO 5G)

VILLAVERDE

La Nave
Vehículo autónomo
Diseñado, pendiente de financiación (UNICO 5G)

VILLA DE VALLECAS

Valdemingómez
Entorno Industrial
En adjudicación
Mercamadrid
Vehículo autónomo
Diseñado con financiación HORIZON 2020

CORREDORES URBANOS 5G



Cities 5.0 A Human Adaptive City

Forward to an open and interoperable cities



The city leads, because the city council needs compatibility, interoperability and protection of the investments.

Standards are needed, **but not so many**





Smart Urban Spaces

5G corridors, hyperconnectivity IoT , data and cybersecurity



PHYSICAL SPACES DEMONSTRATING THE CAPABILITIES OF IoT INTEGRAL AND INTENSIVE AS A SOURCE OF QUALITY INFORMATION FOR A CITY MANAGED BY DATA FOR SERVICES ADJUSTED TO PEOPLE AND NEEDS

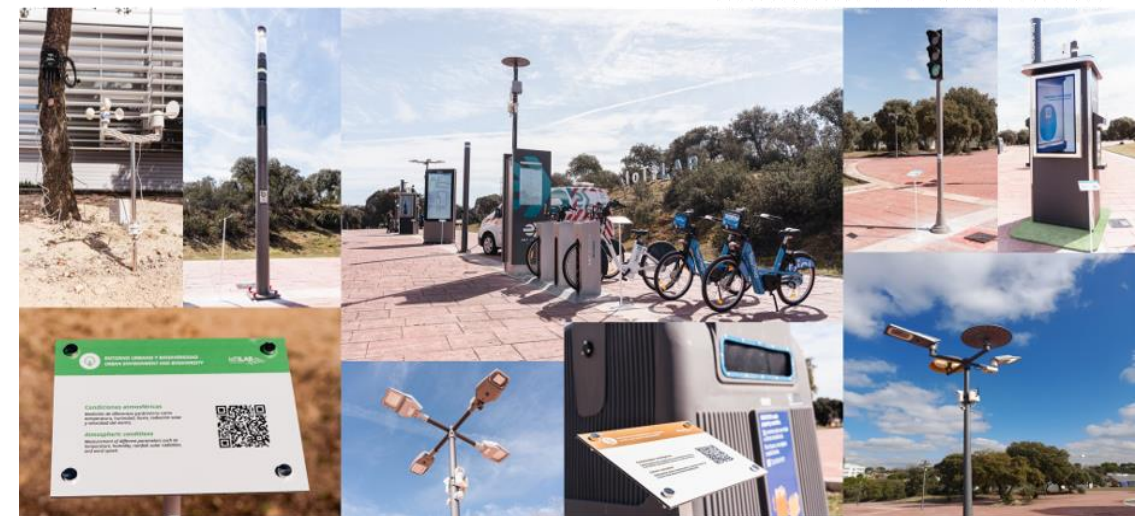
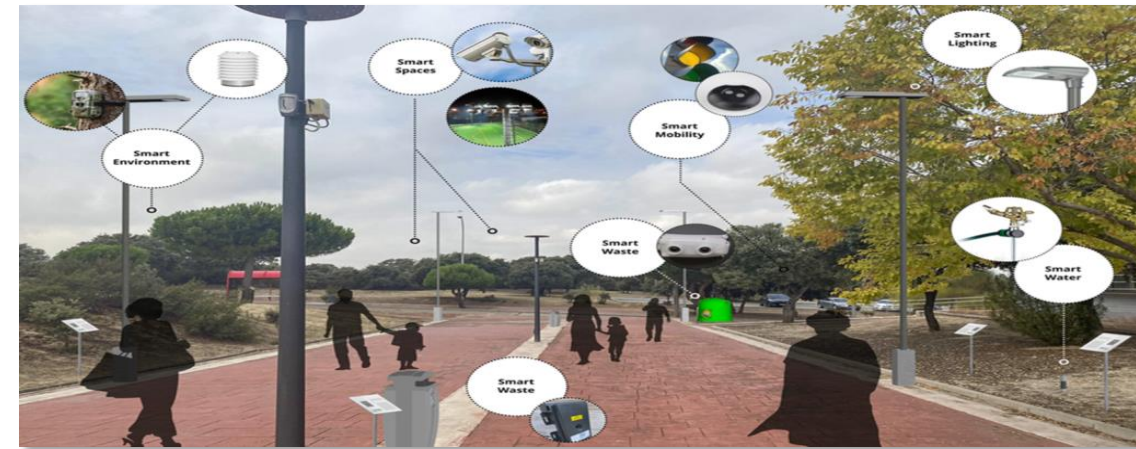
Measurement with **SENSORS** in urban facilities to obtain reliable data

INTERACTION through mobile apps and signage.

DATA- driven management : Big Data, AI and Digital Twin.

INTERDISCIPLINARY : environmental sensors, energy, lighting, mobility, containers, etc.

INTEROPERABILITY : of the equipment of each municipal area.



Smart Urban Spaces

5G corridors + IoT hyperconnectivity + data and cybersecurity

Physical spaces that demonstrate the capabilities of **comprehensive and intensive IoT** as a source of quality information for a data-driven city for services tailored to people and their needs.

Not sandboxes: they are managed by the companies now operating in the city: knowledge transfer from University to technicians who install the devices and operate, change the broken devices...



Trusted data source, in the long term: Strategic collaboration between the European Commission and the City Council of Madrid in the field of **public digital services**: Data spaces and smart cities for greater interoperability in 4 dimensions (legal, organisational, semantic and technical)

The 21 districts and 131 neighborhoods of Madrid





NO ONE BEHIND

DIGITAL INCLUSION

Digital skills for all

"Digital Training, city talent"

Human technology

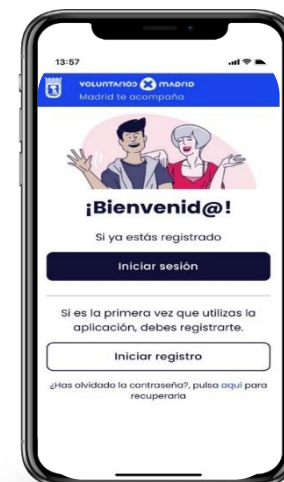
"Digital Services for people"

Volunteering

- Serving 500,000 seniors
- More than 18,000 volunteers

eman
cipatic

VOLUNTARIOS  MADRID



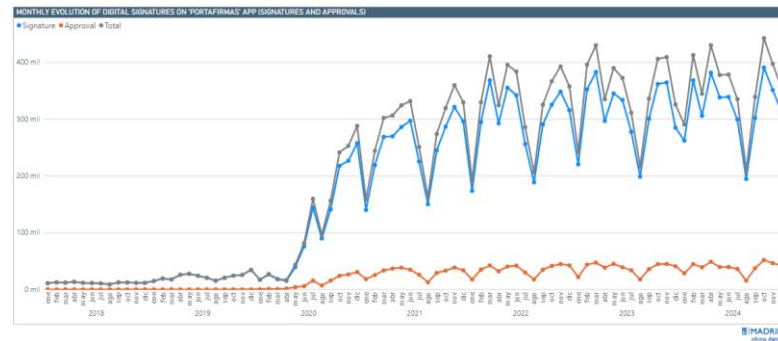
PALOMA

PALOMA is a social intervention project that uses Artificial Intelligence to detect and combat unwanted loneliness in people over 75 years of age. The system makes phone calls and analyzes responses to identify risk cases.

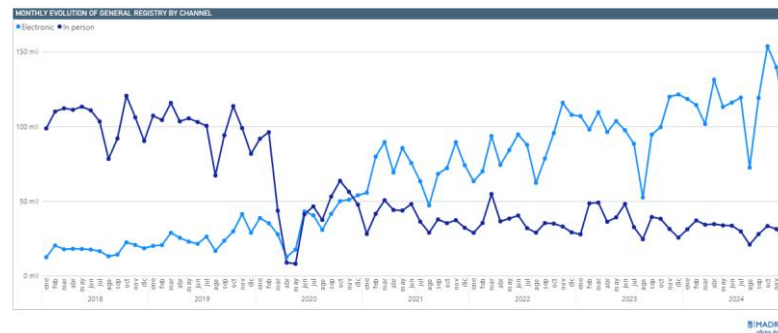
- 1 *Detection*
- 2 *Intervention*
- 3 *Improvement*

AI for the PEOPLE

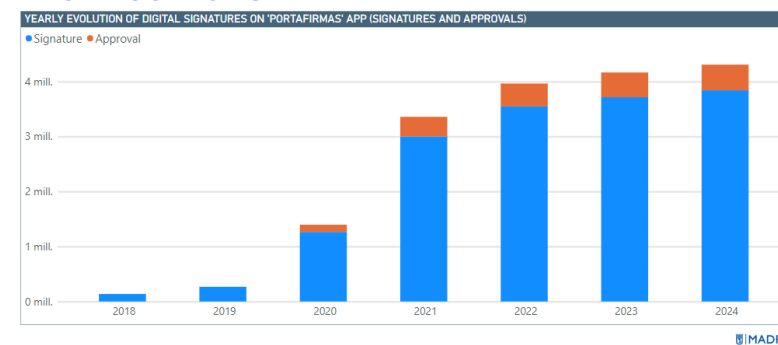
ELECTRONIC SIGNATURES AND APPROVALS



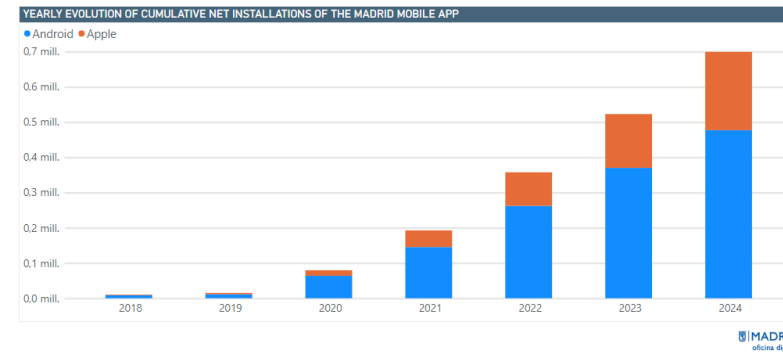
GENERAL ENTRY OF DOCUMENTS



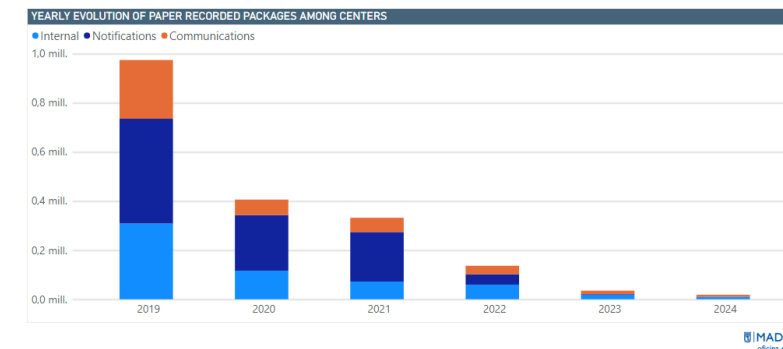
DIGITAL SIGNATURES



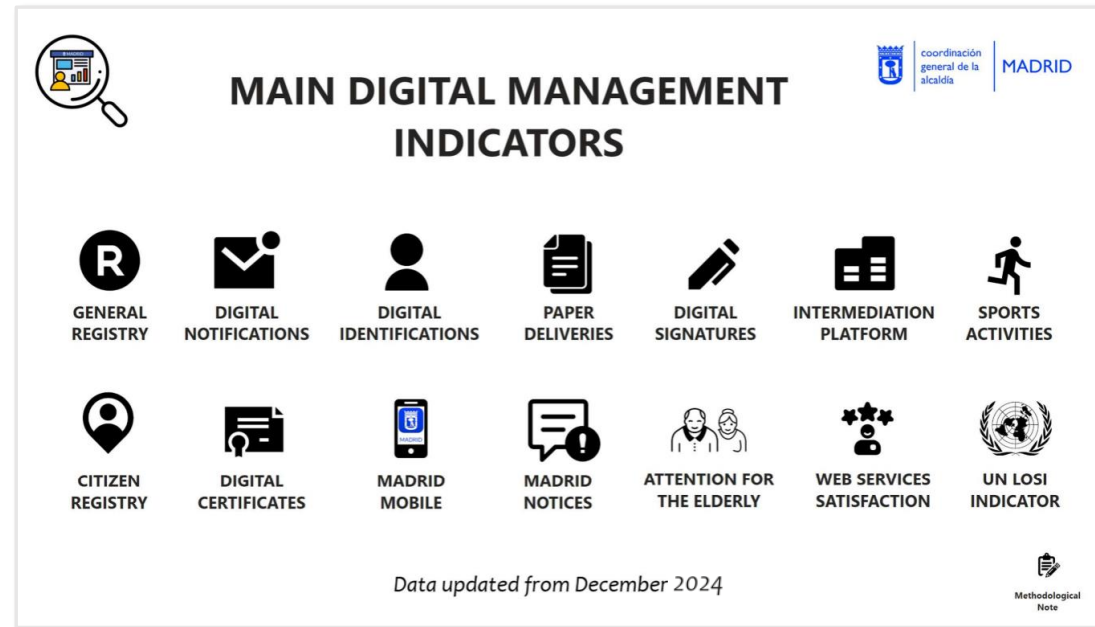
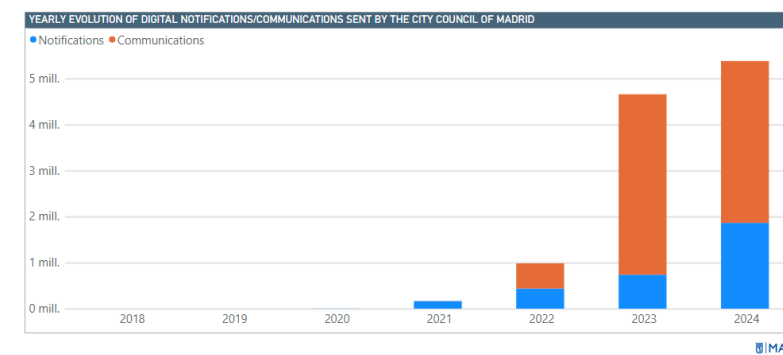
NET INSTALLATIONS OF APP MADRID MOVIL (*)



PAPEL DELIVERY AMONG CENTERS (*)



E – NOTIFICATION (*)





Also Leading in 2022

Table 4.1 Cities in the very high LOSI category, 2024

City	Country	LOSI value
Tallinn	Estonia	0.9271
Madrid	Spain	0.9271
Riyadh	Saudi Arabia	0.9167
Copenhagen	Denmark	0.9063
Dubai	United Arab Emirates	0.9063
New York	United States of America	0.9063
Istanbul	Türkiye	0.8958
Berlin	Germany	0.8854
Seoul	Republic of Korea	0.8750
Singapore	Singapore	0.8750
London	United Kingdom of Great Britain and Northern Ireland	0.8750
Shanghai	China	0.8646
Manama	Bahrain	0.8542
Tokyo	Japan	0.8542

Previous work from which the strategy is born has served to position Madrid as the first most digitized city, tied with Tallin (Berlin in 2022) according to the latest UN report



Award for “Technology for people” - 2023

EIPA Good Practice Certificate 2024:



Digital sustainability: Contribution of technology to the green and digital transition in the city of Madrid, Madrid City Council, Spain



CONCLUSIONS

- Cooperation and collaboration: stakeholders, society, Public sector, Academia
- Interoperability
- Technology as a means, not an end
- Green and digital technology
- Inclusive attractive city
- Cybersecurity, security and resilience at its core
- Citizen empowerment
- Training and change management



Capital
Digital



HUMAN, GREENER, DIGITAL AND SUSTAINABLE

oficinadigital@madrid.es



Madrid Digital Office

<https://www.linkedin.com/in/oficina-digital-madrid/>

